REMARKS

This responds to the Office Action dated March 11, 2005 in the present application. Claims 1-31 are pending in the present application. Claim 26 has been amended to overcome typographical errors. Individual issues raised in the Office Action are addressed next.

Specification

In paragraphs 1-2 of the Office Action, the Abstract of the application was objected for containing several informalities. In response, applicant submits herewith an amended Abstract in which all identified informalities have been corrected. Accordingly, withdrawal of the objection is respectfully requested.

Claim Objections

In paragraph 3 of the Office Action, claim 26 was objected for having several typographical errors. In response, applicant amended claim 26 to correct all identified informalities. Accordingly, withdrawal of the objection is respectfully requested.

Claim Rejections under 35 U.S.C. 102

In paragraphs 1-2 of the Office Action, claims 1-3, 5-9, 12-20 and 23-31 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,816,564 to Charles et al. Applicant respectfully traverses. First, independent claim 1 of the present application is patentable over the Charles reference at least because the reference fails to disclose that a 3D virtual representation of a bone is displayed and the orientation of displayed 3D virtual representation is determined using the difference between the first and second orientations from which the first and second image data of the bone were obtained, as recited in claim 1. Second, independent claims 27 and 31 are patentable over the Charles reference, because the reference does not disclose that an image of the virtual representation of the first portion of the bone and an image of the first portion of the bone are overlaid on a display device, as recited in claims 27 and 31.

In particular, the Charles reference discloses a technique for deriving bone properties from several x-ray images of a bone. (See, Charles at col. 2, ll. 64-67). The reference teaches that several x-ray images of a bone can be taken at various projection angles, and a three-dimensional computer model of the bone can be generated. (*Id.* at col. 10, ll. 20-25). The 3D model can then be used to determine bone mineral content and mass, which can be further used to evaluate bone injury, such as breakage. (*Id.* at col. 17, ll. 10-12). The Charles reference, however, does not disclose that the generated 3D representation of a bone is

displayed on a display device. Moreover, Charles does not teach, disclose or even suggest that orientation of the displayed 3D representation may be determined using the difference between the orientations of the images from which the 3D representation is generated, as recited in claim 1 of the present application; nor does the reference teach that an image of the virtual representation of the bone and an image of the bone are overlaid on a display device, as recited in claims 27 and 31. Accordingly, claims 1, 27 and 31, as well as the claims dependent thereon, are patentable over the Charles reference.

In paragraph 3 of the Office Action, claims 1-4, 12, 23, 27 and 31 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,711,432 to Krause et al. Applicant respectfully traverses. First, independent claim 1 of the present application is patentable over the Krause reference at least because the reference fails to disclose that a 3D virtual representation of a bone is displayed and the orientation of the displayed 3D virtual representation is determined using the difference between the first and second orientations from which the first and second image data of the bone were obtained, as recited in claim 1. Second, independent claims 27 and 31 are patentable over the Krause reference, because the reference does not disclose that an image of the virtual representation of the first portion of the bone and an image of the first portion of the bone are overplaid on a display device, as recited in claims 27 and 31.

In particular, the Krause reference discloses a system for implementing a computer-aided orthopedic surgery utilizing intra-operative feedback. The system maintains a database of three-dimensional template models of "normal" bones. (*See*, Krause at col. 4, ll. 39-43). A 3D bone model is created from several x-ray images taken from humans of different ages, genders, heights and other characteristics. (*Id.* at col. 5, line 58 to col. 6, line 8). Notably, various parameters of the 3D model may be modified to reshape the 3D model to resemble the patient's actual (e.g., deformed) bone structure. (*Id.* at col. 6, ll. 33-35; col. 7, ll. 20-44). During the surgery, a 3D model that most closely fits patient's age, gender and other characteristics is retrieved from the database, reshaped based on patient's x-ray images to resemble patient's actual bone structure, and graphically projected onto a two-dimensional plane. (*Id.* at col. 6, ll. 10-13). The result of this procedure is a series of <u>two-dimensional representations</u> of the patient's bone from various angles. (*Id.* at col. 6, ll. 48-50).

In contrast, the present application discloses a method for generating 3D virtual representations of bones <u>directly</u> from patient's x-rays rather than from pre-fabricated models of "normal" bones, as taught by Krause. (*See*, e.g., paragraphs 45-46 of the specification).

Furthermore, the generated 3D virtual representations of patients actual bones are displayed in three-dimensions, as recited in claim 1 of the present application, and not as "two-dimensional representations," as disclosed and taught by Krause. Moreover, the orientation of the displayed 3D virtual representation is determined using the difference between the orientations of the fluoroscope images of the patient's bone that are used to generate the 3D representation, as recited in claim 1 of the application, while Krause teaches that the two-dimensional representations of bone are merely displayed from various angles. Finally, as recited in claims 27 and 31 of the present application, a virtual representation of the bone and an image of the bone are overplayed on a display device to indicate an intraopartive orientation of the bone. In contrast, in Krause, the two-dimensional representation are not overlaid with actual images of the patient's bone to indicate an intraopartive orientation of the bone, but rather displayed from various angles. In fact, Krause does not disclose that a virtual representation may be overplayed with an actual bone image for displaying. Accordingly, claims 1, 27 and 31, as well as the claims dependent thereon, are patentable over the Krause reference.

Claim Rejections under 35 U.S.C. 103

In paragraphs 4-5 of the Office Action, claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Charles et al. in view of Krause et al. and claims 10, 11, 21 and 22 were rejected as being unpatentable over Charles et al. in view of U.S. Patent No. 6,560,476 to Pelletier et al. In response, applicant respectfully submits that claim 4, 10, 11, 21 and 22 are patentable over the prior art of record at least because they depend on claim 1, which is believed to be patentable in view of the foregoing remarks.

Conclusion

In view of the above, applicant respectfully submits that the present application is in condition for allowance. A favorable disposition to that effect is respectfully requested. Should the Examiner have any questions or comments concerning this submission, he is invited to call the undersigned at the phone number listed below.

Respectfully submitted,

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